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Material performance of nickel ions adsorption by larix sibirica needles

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Abstract

© 2016 Authors. Adsorption of ions of nickel on alternative sorption material - needles of Siberian larch (Larix sibirica) is investigated at temperatures of 20, 30 and 40 0C. The maximum sorption capacities of needles of Larix sibirica in relation to ions of nickel (II) at temperatures of 20 are determined °C, 30° C, 40° C which made 0,80 mmol/g (47,2 mg/g), 0,87 mmol/g (51,3 mg/g) and 0,92 mmol/g (54,3 mg/g) respectively. Isotherms of adsorption are received and shortchanged with use of models of Langmuir, Friendlich, Temkin and Dubinin-Radushkevich. It is defined that process of adsorption of ions of Ni2+at a temperature of 20the ° C is best of all described by Friendlich's model (R2 = 0,983), and at temperatures of 30° C and 40° C - the Langmuir model (R2 = 0,995 and 0,996 respectively). By the carried-out calculations it is defined that process of adsorption of ions of Ni2+needles of Larix sibirica treat processes of physical adsorption as values of energy of adsorption have size less than 8 kJ/mol, and values of energy of Gibbs demonstrate spontaneous course of physical adsorption. Processing of kinetic dependences of processes of adsorption of ions of nickel (II) Larix sibirica needles at three temperatures within diffusive model defined the limiting stages of processes - the mixed diffusion.

Keywords

Adsorption isotherm, Ions of nickel, Needles of a larch Siberian, Sorption material, Water purification

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